

**REMARKS**

Claims 1-15, 17-18 and 20 are pending. Claim 8 is amended, and claim 19 is canceled in this response. Reconsideration of the application is respectfully requested in view of the following remarks.

**I. REJECTION OF CLAIM 8 UNDER 35 U.S.C. § 112 SECOND PARAGRAPH**

Claim 8 was rejected under 35 U.S.C. § 112, second paragraph as being indefinite. Claim 8 has been amended to depend on claim 7, and now has antecedent basis for the limitation "low-pressure anneal." Accordingly, withdrawal of the rejection is respectfully requested.

**II. REJECTION OF CLAIMS 1-18 UNDER 35 U.S.C. § 112 FIRST PARAGRAPH**

Claims 1-18 were rejected under 35 U.S.C. § 112, first paragraph as allegedly failing to comply with the written description requirement. Withdrawal of the rejection is respectfully requested for at least the following reasons.

The written description requirement of Section 112, first paragraph requires that the claimed subject matter be described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. It is respectfully submitted that under such standard, the specification meets the requirements of Section 112, first paragraph.

In applicants' specification, when a plasma was employed in a cleaning process, the term "dry clean" was used, while in instances where a plasma was *not* used, the term "anneal" was employed. For example, in paragraph [0013] of applicants' specification, it states:

Various wet clean and/or dry clean technologies may be used, and either may be repeated a number of times as needed. In particular embodiments, the etched wafer 100 may first be subjected to a dry clean

process (not shown) to remove the photoresist after etching. The dry clean may include an application of a hydrogen (H) plasma and may further include H, oxygen (O), and/or an inert gas, such as argon (Ar), helium (He), neon (Ne), xenon (Xe) or some other inert gas, the plasma generated by applying radio frequency (RF) or microwave frequency radiation.

In discussing, the non-plasma anneal, paragraph [0017] of applicants' specification states;

It was found that the volatile components were successfully removed, without affecting CD or causing metal extrusions, by performing an anneal of elevated temperature in a low pressure (from substantially one atmosphere of pressure to substantial vacuum) environment for a limited duration of time.

Further, paragraph [0020] of the specification states:

The anneal may be performed in a furnace of suitable design to achieve the anneal parameters specified. The anneal may also be performed in an asher operated ***without applying RF or microwave radiation....*** (Emphasis added).

Lastly, claim 20, as originally, filed recited "performing a low-pressure, high temperature, limited duration anneal... [that] is exclusive of an application of a plasma...." Clearly, then, from the above portions of applicants' specification, one of ordinary skill in the art clearly would understand that the anneal of the present invention contemplates a non-plasma anneal, and that this feature was in the possession of the inventors at the time of filing. Therefore the specification meets the requirements of Section 112, first paragraph. Accordingly, withdrawal of the rejection is respectfully requested.

### **III. REJECTION OF CLAIMS 1, 9-13 AND 15 UNDER 35 U.S.C. § 102(e)**

Claims 1, 9-13 and 15 were rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent Application Serial No. 2003/0194877 (Yau et al.).

Withdrawal of the rejection is respectfully requested for at least the following reasons.

In rejecting the above claims in view of Yau et al., the Office Action ignores the claim limitations being cited, and instead merely asserts that Yau et al. disclose inherently a non-plasma anneal. Assuming *arguendo* that the cited art does inherently disclose a non-plasma anneal, the cited reference does not do so in the context of patterning cleaning a via ***in a dielectric layer*** as recited in the claimed invention, and thus does not anticipate the present invention.

Claim 1 is directed to a method of cleaning a wafer. The method comprises patterning a via and/or a trench ***in a porous, low-k dielectric layer***, and cleaning polymer residue from surfaces of the patterned dielectric. The method further comprises performing a non-plasma anneal ***on the patterned dielectric layer*** to remove a component of the solvent. Yau et al. do not teach this feature of claim 1.

***Yau et al. teach the patterning of a metal layer.*** After patterning thereof, a clean and anneal is performed ***on the exposed metal*** prior to a capping operation to cover the metal prior to exposure to an ambient atmosphere. Yau et al. do not teach or suggest cleaning of polymer from a patterned dielectric with a solvent and then performing a non-plasma anneal ***on the dielectric*** to remove a component of the solvent from the dielectric as claimed. Therefore Yau et al. do not anticipate the invention of independent claim 1 and its associated depending claims. Accordingly, withdrawal of the rejection is respectfully requested.

#### **IV. REJECTION OF CLAIMS 1-3, 5-8 AND 16-18 UNDER 35 U.S.C. § 102(b)**

Claims 1-3, 5-8 and 16-18 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent Application Serial No. 2002/0058397 (Smith et al.).

Withdrawal of the rejection is respectfully requested for at least the following reasons.

As highlighted above, claim 1 recites ***performing a non-plasma anneal on the patterned dielectric layer*** to remove a component of the solvent. Smith et al. do not teach this feature. Rather, Smith et al. disclose ***a plasma based anneal***. Therefore Smith et al. do not anticipate independent claim 1 and its associated depending claims. Accordingly, withdrawal of the rejection is respectfully requested.

**V. REJECTION OF CLAIMS 4, 14 AND 19 UNDER 35 U.S.C. § 103(a)**

Claims 4, 14 and 19 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Smith et al. in view of U.S. Patent Publication No. 2004/0060579 (Kim et al.). Claim 19 has been canceled. Withdrawal of the rejection of claims 4 and 14 is respectfully requested for at least the following reasons.

Claims 4 and 14 each depend upon claim 1, either directly or indirectly, which recites a non-plasma anneal. As highlighted above Smith et al. do not teach a non-plasma anneal, and Kim et al. do not remedy the deficiencies in the primary reference. Therefore claims 4 and 14 are non-obvious over the cited art, and withdrawal of the rejection is respectfully requested.

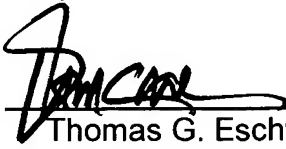
**VI. CONCLUSION**

For at least the above reasons, the claims currently under consideration are believed to be in condition for allowance.

Should the Examiner feel that a telephone interview would be helpful to facilitate favorable prosecution of the above-identified application, the Examiner is invited to contact the undersigned at the telephone number provided below.

Should any fees be due as a result of the filing of this response, the Commissioner is hereby authorized to charge the Deposit Account Number 20-0668, TI-33260.

Respectfully submitted,  
ESCHWEILER & ASSOCIATES, LLC


By   
Thomas G. Eschweiler  
Reg. No. 36,981

National City Bank Building  
629 Euclid Avenue, Suite 1210  
Cleveland, Ohio 44114  
(216) 502-0600

CERTIFICATE OF MAILING (37 CFR 1.8a)

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to: Mail Stop AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Date: February 24, 2006

  
Christine Gillroy